Fig.1

ρ

source

detector

ω_{source} $\omega_{detector}$

turbid media

Reflectance $R(\rho)$

$R(\rho)$ depends on μ_s, μ_a and $p(\theta)$

radial distance ρ

Fig.2

Fig. 3

$\mu_s' = 1\ mm^{-1}$

—— · $g_1 = 0.92,\ g_2 = 0.81,\ \gamma = 2.25$

——— $g_1 = 0.2,\ g_2 = 0.0,\quad \gamma = 1.25$

— — — $g_1 = 0.5,\ g_2 = 0.375,\ \gamma = 1.25$

········ $g_1 = 0.9,\ g_2 = 0.875,\ \gamma = 1.25$
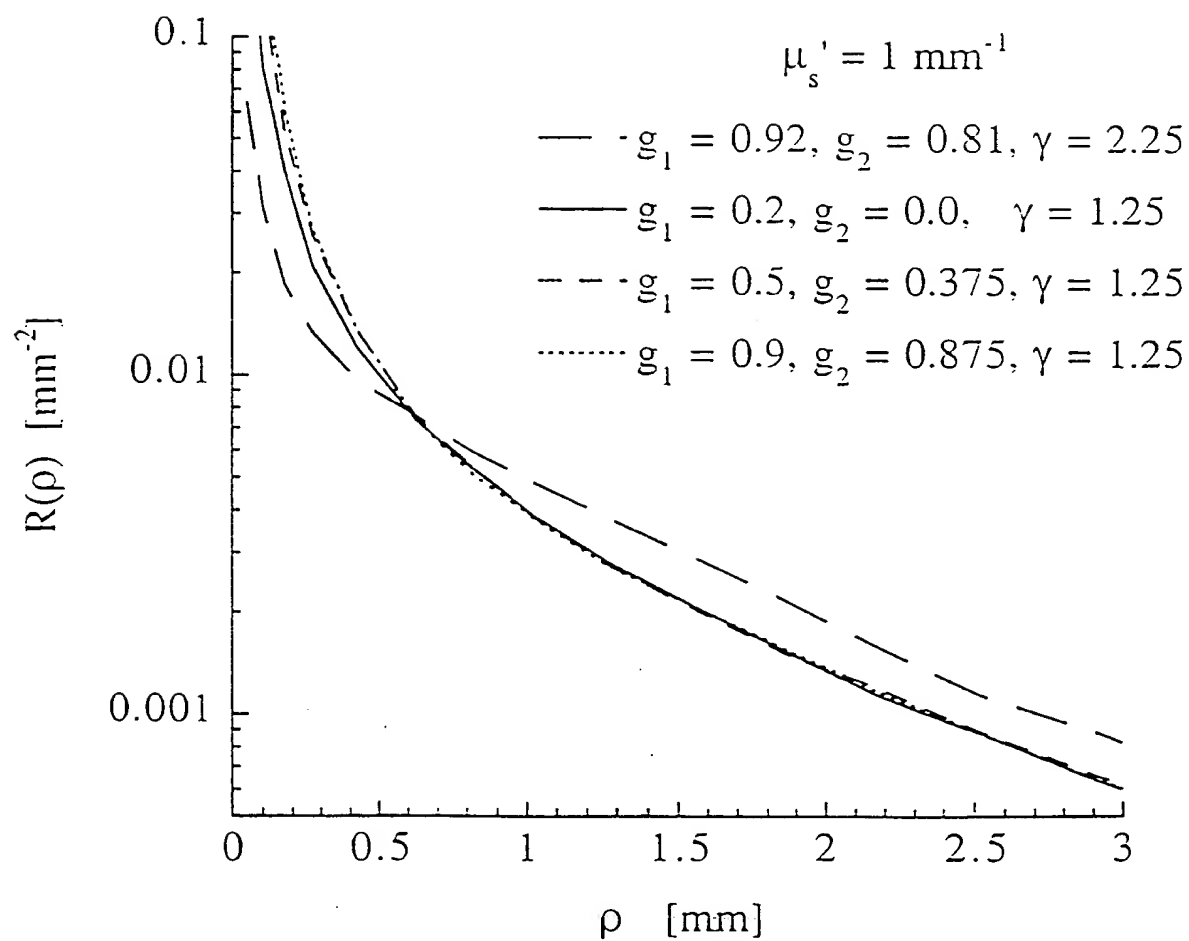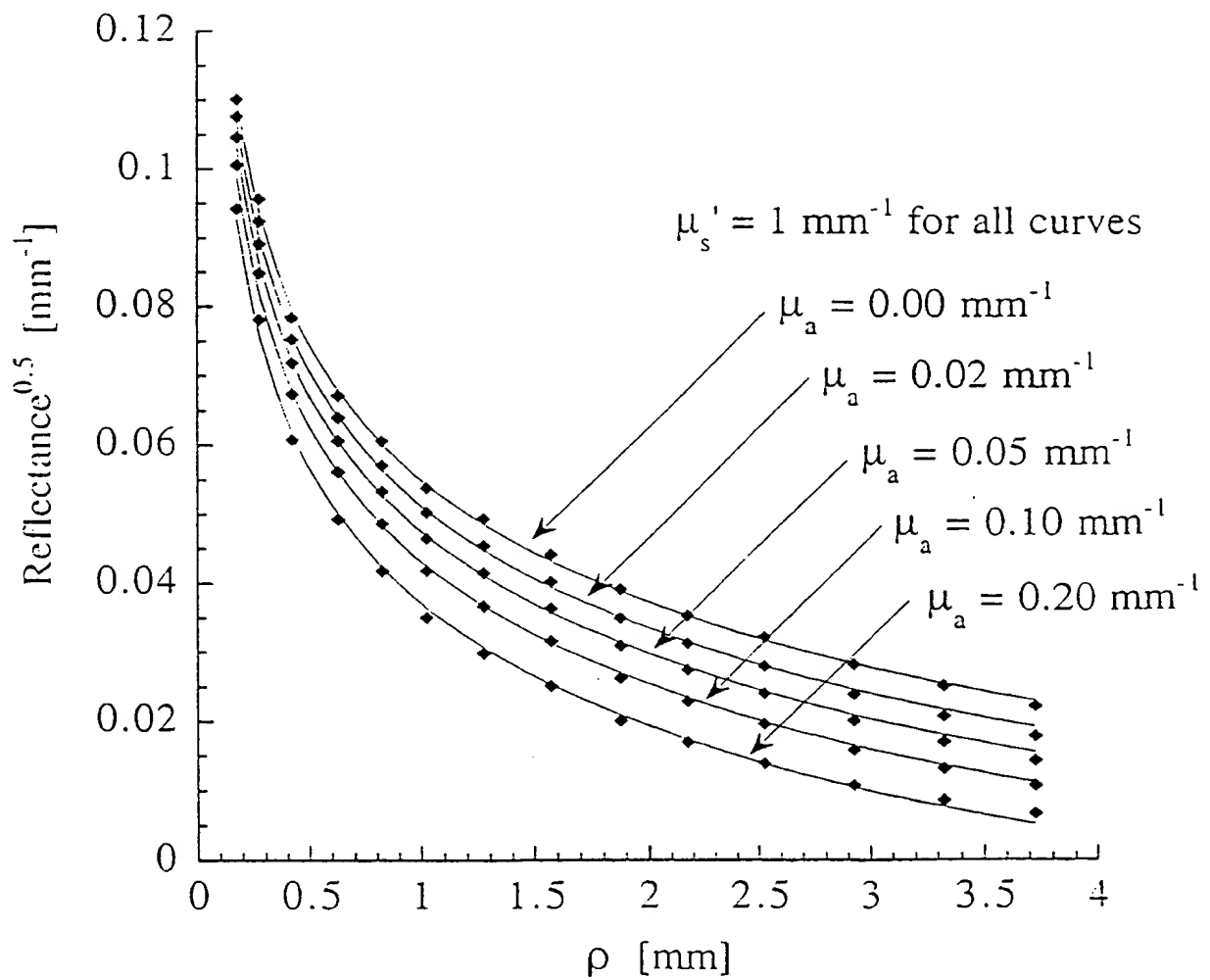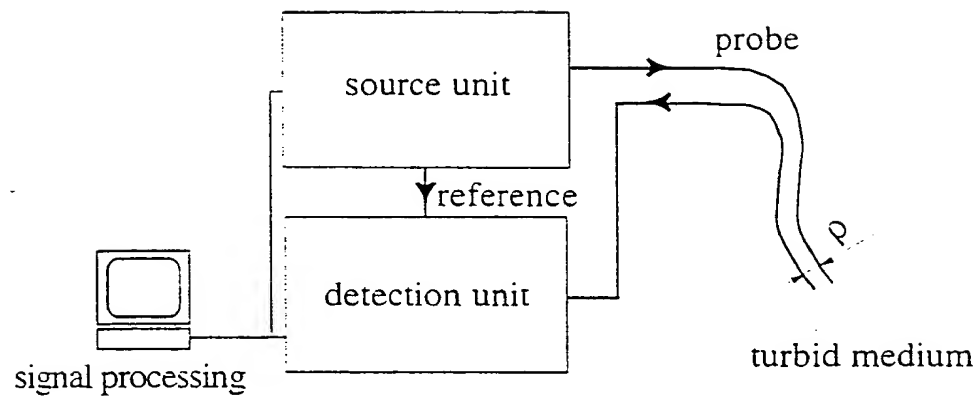
Fig. 4

◆ Monte Carlo simulations

— analytical form $R^{0.5} = A(\rho, \mu_s', \gamma) + \mu_s' B(\mu_a)$

$\mu_s' = 1\ \text{mm}^{-1}$ for all curves

$\mu_a = 0.00\ \text{mm}^{-1}$

$\mu_a = 0.02\ \text{mm}^{-1}$

$\mu_a = 0.05\ \text{mm}^{-1}$

$\mu_a = 0.10\ \text{mm}^{-1}$

$\mu_a = 0.20\ \text{mm}^{-1}$

Reflectance$^{0.5}$ [mm^{-1}]

ρ [mm]

Fig. 5a

source unit

probe

reference

detection unit

ρ

signal processing

turbid medium

Fig. 5.b

Apparatus:

μ_a and μ_c'
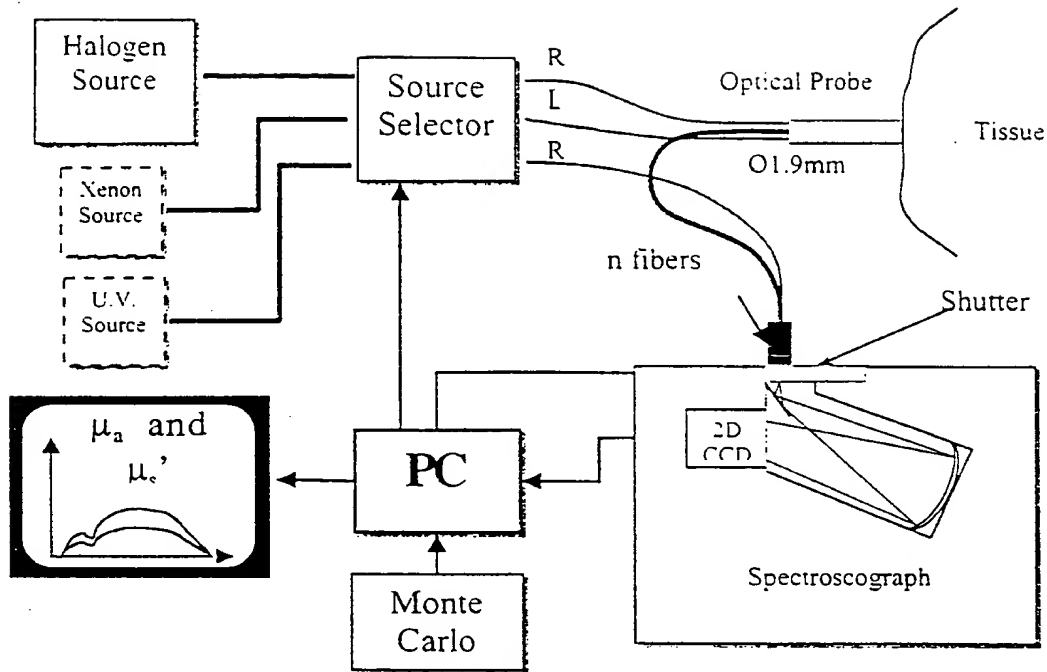
Details of the optical probe:

Fig. 5c

signal processing

source

turbid medium

detector
(1D or 2D array)

Fig. 5d

scanning
system 1

source unit

detector
(1D or 2D array)

signal processing

turbid medium

imaging   scanning
system   system 2

Fig. 5e

scanning
system 1

source unit

detection unit

turbid medium

signal processing

scanning
system 2
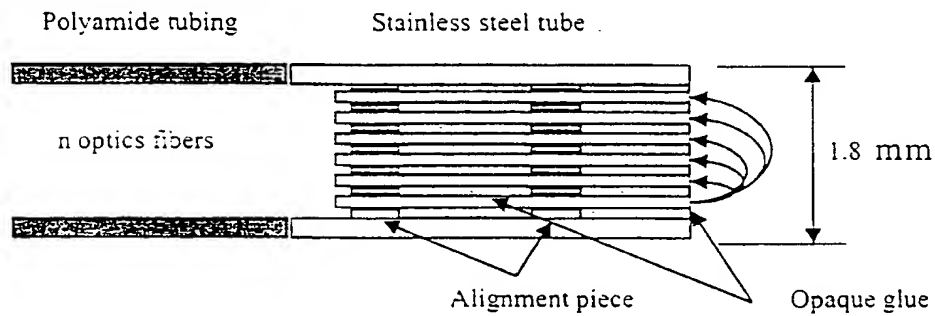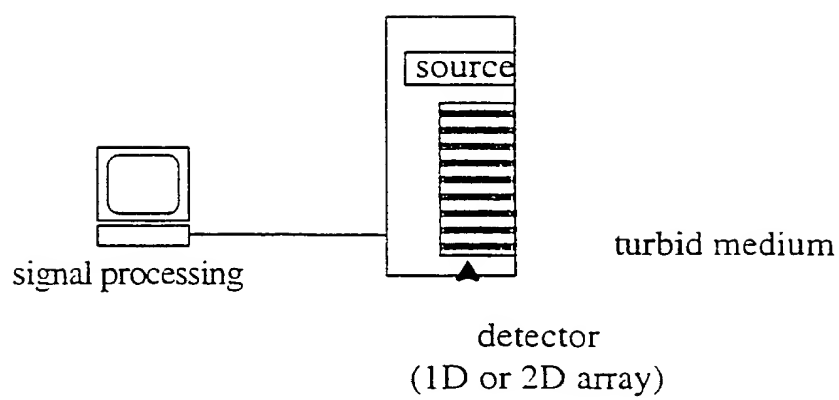
09/806831
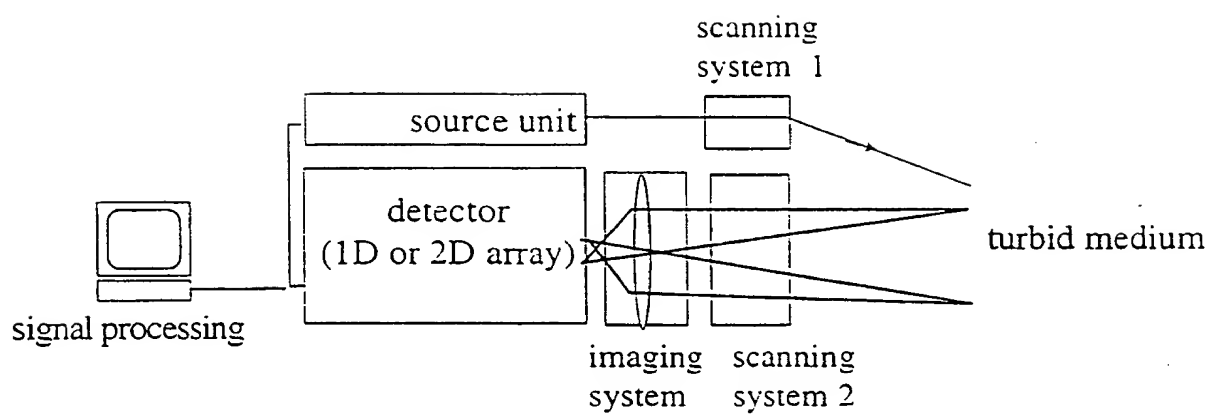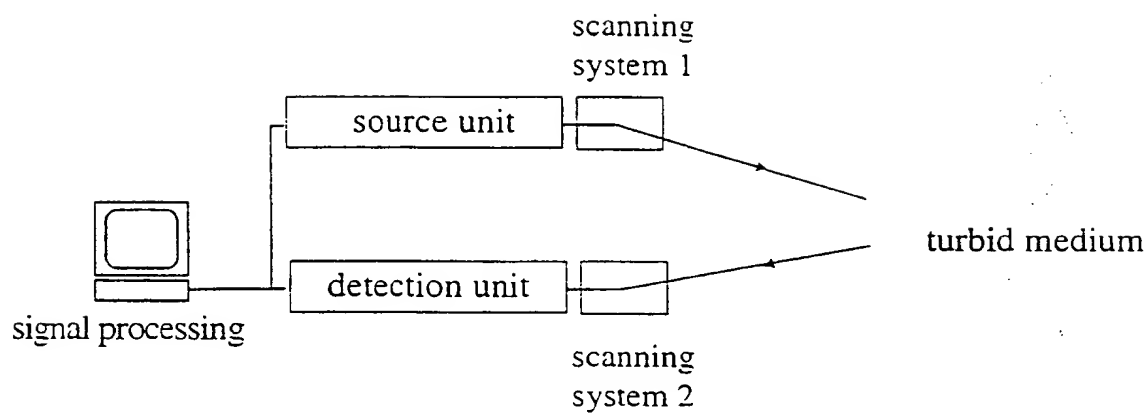
Fig.6a

detecting fibers
illuminating fibers

or
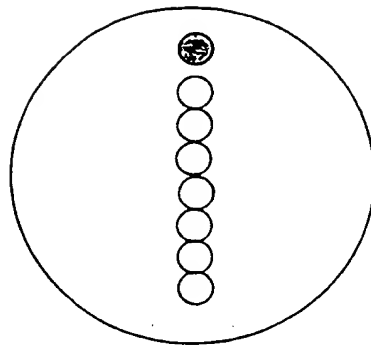
illuminating fibers
detecting fibers

Fig. 6b

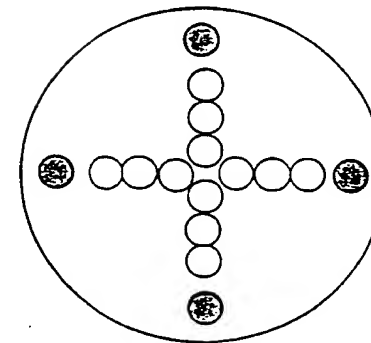detecting fibers
illuminating fibers

or
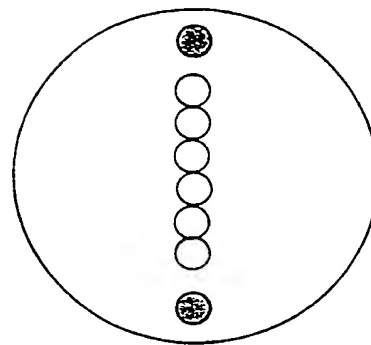
illuminating fibers
detecting fibers

Fig. 6c

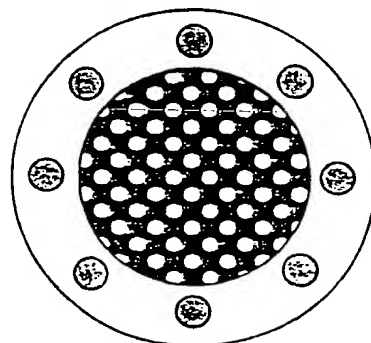detecting fibers
illuminating fibers

or

illuminating fibers
detecting fibers

Fig.6d
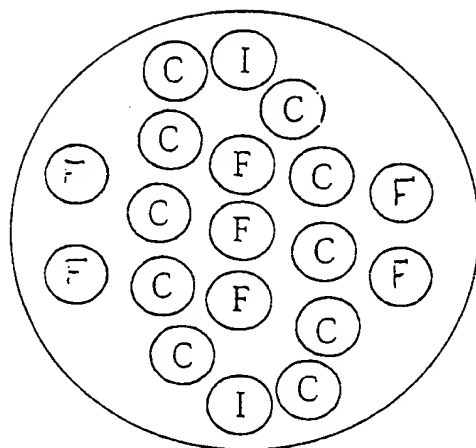
single core fiber
(detection or
illumination)

multicore fiber or
bundle of optical fibers
(detection or
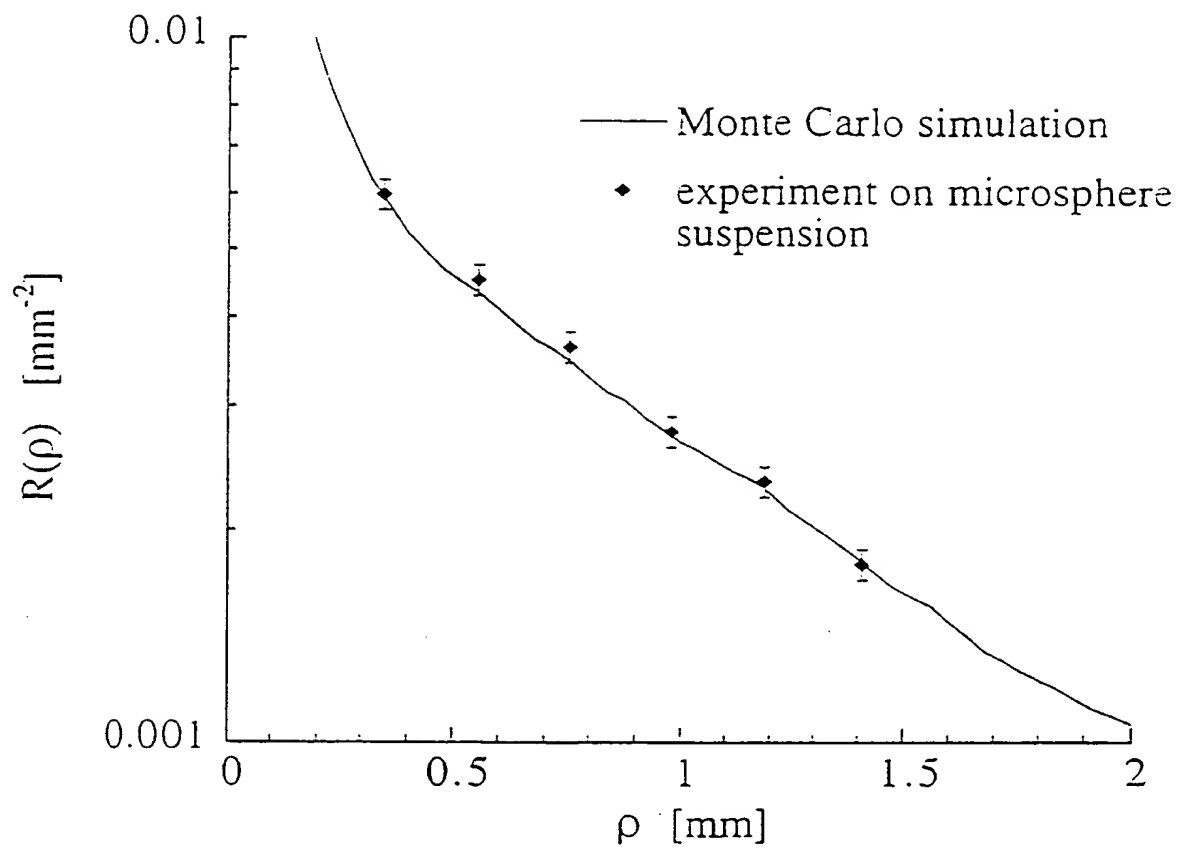illumination)

09/806 831

Fig. 6e

I: Illuminating fibers
C: detecting fibers
F: additional fibers

Fig. 7

Fig. 8

Fig. 9

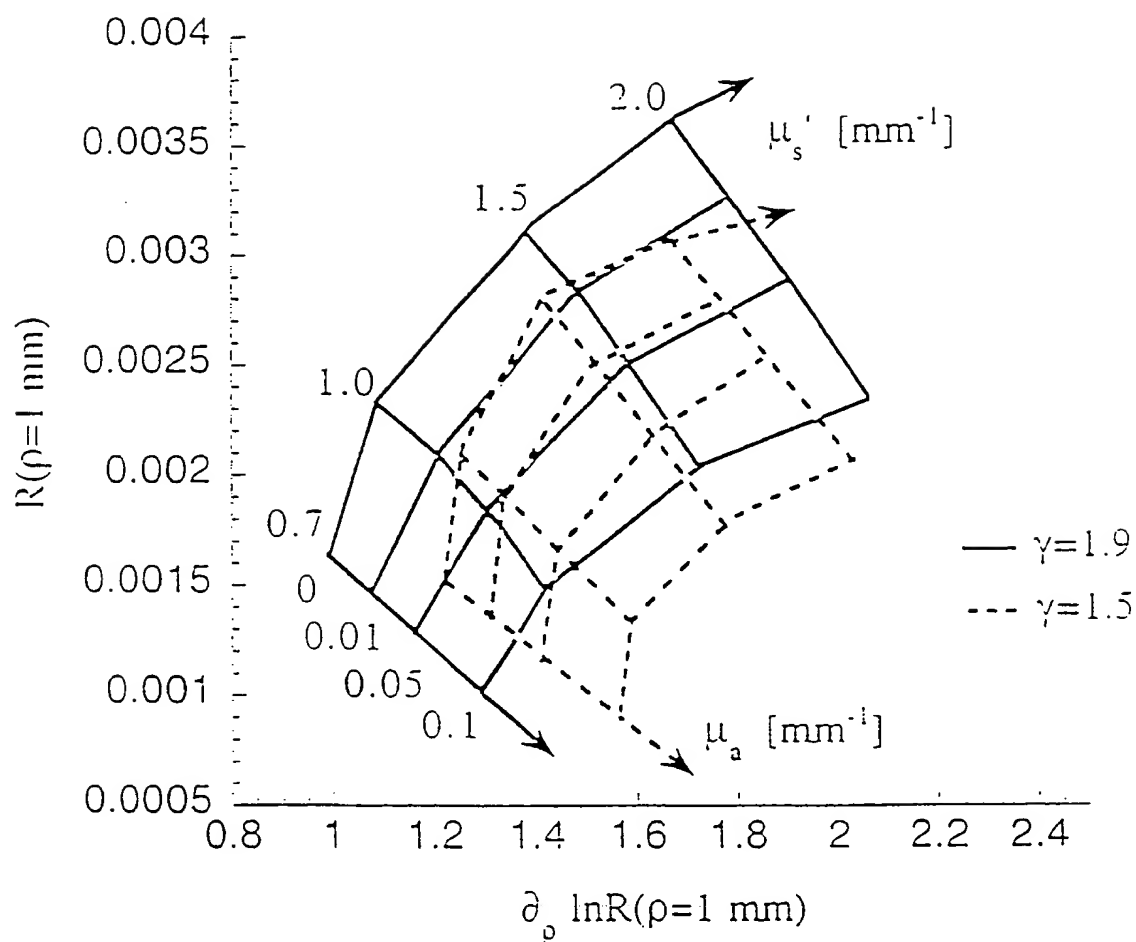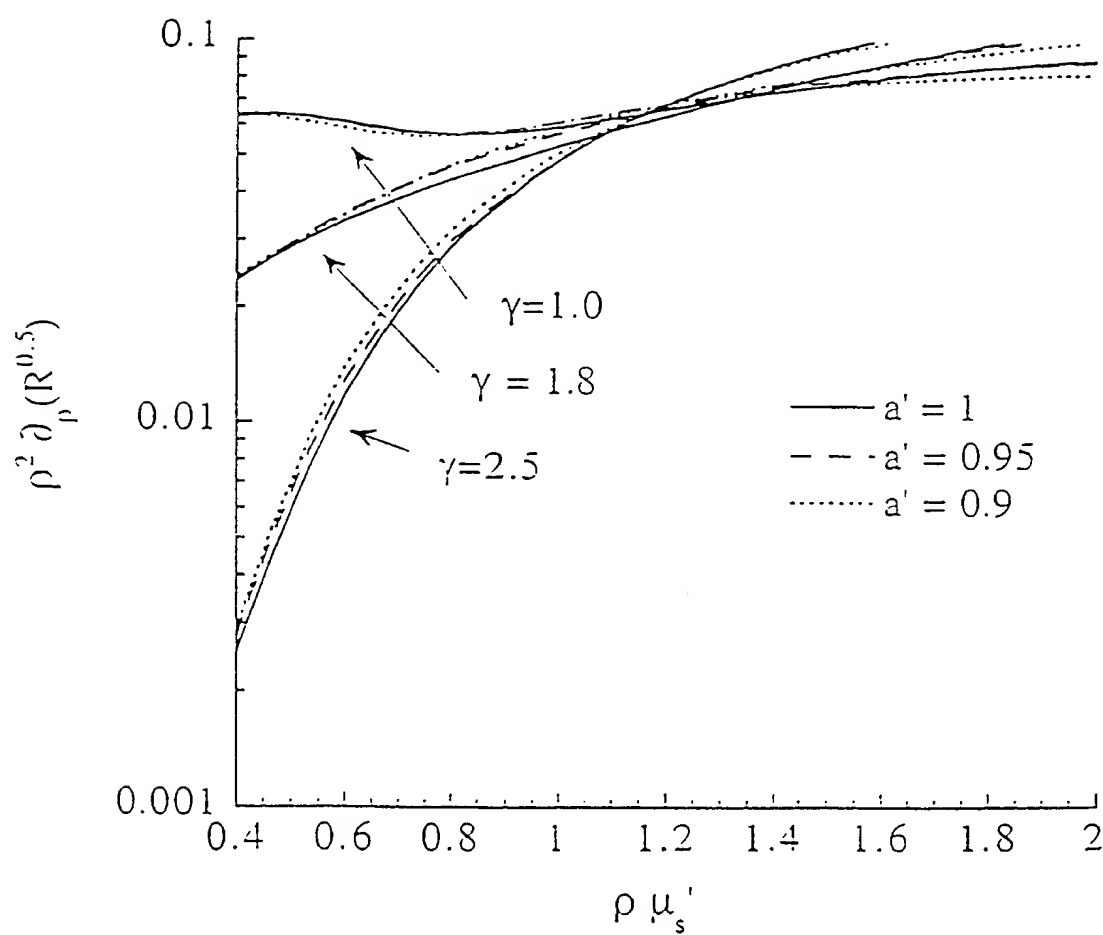Fig. 10